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Comprehensive Revenue and Expense Data Collection Methodology for Teaching Health Centers: A Model for Accountable Graduate Medical Education Financing

--Manuscript Draft--

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Abstract:	Background: Despite considerable federal investment, graduate medical education (GME) financing is neither sufficiently transparent to estimate residency training costs nor accountable for effectively producing a physician workforce that matches national healthcare needs. The Teaching Health Center Graduate Medical Education (THCGME) program's authorization in 2010 provided an opportunity to establish a more transparent financing mechanism. Objective: To develop a standardized methodology for quantifying the investment necessary to train primary care physicians in high-need communities. Methods: The THCGME Costing Instrument was designed utilizing guidance from site visits, financial documentation, and expert review. It collects educational outlays, patient service expenses and revenues from residents' ambulatory and inpatient care, and payer mix. It was fielded from April to November 2015 to 43 THCGME-funded residencies of varying specialties and organizational structures. Results: In contrast to Medicare cost reports that aggregate GME expenses in several line items and exclude residents' revenue generation, the THCGME Costing Instrument collected standardized, detailed cost data on residency labor (84%, n=36), administration and educational outlays (77%, n=33), ambulatory care visits and payer mix (70%, n=30), and patient service expenses as well as revenues generated by residents (60%, n = 26). Conclusion: The THCGME Costing Instrument provides a model for calculating evidence-based costs and revenues of community-based residency programs and offers an approach to estimating residency costs and revenues in all settings regardless of sponsorship, thereby addressing calls for enhanced transparency and accountability in GME financing.

Cover Letter

THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, DC

Department of Health Policy and Management

Dear Drs. Cooney and Sullivan,

We thank you for provisionally accepting our manuscript "Comprehensive Revenue and Expense Data Collection Methodology for Teaching Health Centers: A Model for Accountable Graduate Medical Education Financing." We appreciate the reviewers' complimentary remarks and their careful review of the manuscript. The word count for the revised submission is 1,970.

We have made edits to address the comments from Reviewer #2:

1. In the "Context of the THCGME Cost Analysis" section, we include the number for each residency specialty supported by THCGME as of academic year 2016/2017.
2,3. We added the two missing programs that we erroneously left out of Table 2. In response to the editors' comments Table 2 is now referenced as supplementary material, and the table shows 36 programs with 27 new programs as stated in the text.
4. In the "Data Completeness" paragraph we clarified which items were not reported due to difficulty in obtaining information and which items were not reported because no expense was incurred.
5. In the sentence: "Thirty-four residencies reported educational fees and insurance expenses, with most reporting costs for licensing fees and exams, board certification preparation and/or board exams," we added "(31)" after "with most".
6. In the "Ambulatory and Inpatient Visits and Payer Mix" paragraph, we include the denominator for Ambulatory Visits and Payer Mix.
7. Unfortunately, the number of residents that serve as the denominator for the 84% training rural and MUCs is not publicly available. We replaced this with information on percentage for 210 graduates from 2015/2016 and include the appropriate reference.
8. In the Conclusion we include a reference with the link to access the Costing Instrument.

We also made the following changes in response to your comments:

1. We agree with your suggestion to move Table 2 to Supplemental Material. We deleted "Table 2" and wrote "(descriptive characteristics of the 36 residencies are provided as online supplemental material)" in the sentence under "Submission Completeness" where we discuss the programs' characteristics. Table 3 in the original submission is now referenced as Table 2 in the text.
2. In Table 1, we fixed the formatting of the Medicare spending numbers and changed the paragraphs to bullets, making the bullets more succinct.
3. We kept the revised manuscript within the word count limit.

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We are excited for the opportunity to publish this manuscript in the Journal of Graduate Medical Education and hope that you find these revisions sufficient to accept the manuscript for publication. The clean copy and tracked changes version of the revised paper are included in our submission through the editorial manager.

Thank you again for your time and consideration.

Sincerely,

Marsha Regenstein, PhD

Professor of Health Policy and Management
Principal Investigator, Evaluation and Initial Assessment of HRSA Teaching Health Centers
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Full Title: Comprehensive Revenue and Expense Data Collection Methodology for Teaching Health Centers: A Model for Accountable Graduate Medical Education Financing
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Abbreviations

ACA	Affordable Care Act
AHEC	Area Health Education Center
DGME	Direct Graduate Medical Education
GME	Graduate Medical Education
FQHC	Federally Qualified Health Center
HRSA	Health Resources and Services Administration
IME	Indirect Medical Education
THC	Teaching Health Center
THCGME	Teaching Health Center Graduate Medical Education

INTRODUCTION

A landmark 2014 National Academy of Medicine report on U.S. graduate medical education (GME) remarked that GME financing lacks sufficient transparency to estimate residency training costs or accountability to produce a physician workforce that matches the nation's healthcare needs.[1] More than $10 billion was spent on GME in 2016, with Medicare GME payments representing approximately 90% of that total (Table 1).[2,3] Yet, Medicare GME payments are not based on standardized, comprehensive cost data from teaching hospitals.[4] Medicare payments fall into two major categories – direct GME (DGME) and indirect GME (IME). DGME payments, which compensate teaching hospitals for labor costs and educational activities, are tied to the average cost of a hospital's initial years of operating a training program. However, for most hospitals, payments are based on 1984 reported costs. Even with adjustments for cost of living, payments bear little resemblance to hospitals' residency costs today.[1] IME payments—which teaching hospitals receive as an enhancement to their Medicare per-case discharge rates—are essentially baked into the business of providing clinical care irrespective of the actual educational costs associated with running a residency.[5]

Amidst ongoing challenges of transparency and accountability in Medicare GME financing, an opportunity was created in 2010 through the Affordable Care Act (ACA) to systematically collect data to estimate the cost of residency training in community-based settings with the establishment of the Teaching Health Center Graduate Medical Education (THCGME) program.[6] Details of the THCGME program are described in other publications.[7,8,9] Unlike Medicare GME,

THCGME payments were designed to support resident training in underserved and rural communities irrespective of the payer attached to patients seeking care at the training site.[10] Under ACA provisions, the Secretary of Health and Human Services initially set the annual per-resident THCGME payment at $150,000, an interim amount based on expert opinion that would be adjusted following an actual analysis of THCGME residency training costs.[6]

This cost analysis, part of a five-year evaluation of the THCGME program, represents the first government-sponsored systematic data collection effort to standardize expenses and revenues associated with training a primary care resident.[1,4] This paper describes the methodology to quantify these costs and thereby provides a mechanism for achieving greater transparency in federal GME investments.

METHODS

Context of the THCGME Cost Analysis

THCGME supports accredited training programs through direct funding of community-based organizations serving as residency sponsors. Hospital and university-sponsored residencies are ineligible for THCGME funding.[8] Current Teaching Health Centers (THCs) include Federally Qualified Health Centers (FQHCs), consortia of community-based sites, behavioral health clinics, dental clinics, Area Health Education Center (AHEC) organizations, and Tribal Health Authorities. ~~THCGME funds can support primary care training in family medicine, geriatrics, internal medicine, pediatrics and obstetrics/gynecology, psychiatry, and dentistry.~~ As of May 2017, THCGME funded 59 residency programs; of these, 42 began operations with THCGME

funding and 17 pre-existing programs expanded their classes to include additional THCGME slots.[11] THCGME funds ~~can~~ supported three dentistry, ~~primary care~~ ~~residencies~~~~training in:~~ 37 family medicine, one geriatrics, eight internal medicine, three pediatrics, three obstetrics/gynecology, and four psychiatry primary care residencies in academic year 2016/2017.[8]

Designing the THCGME Costing Instrument

We designed the THCGME Costing Instrument to comprehensively capture the full range of training expenses regardless of how programs categorize them within their own organizational context. The tool collects data on residency expenses, residents' ambulatory and inpatient care, payer mix, and residents' patient service expenses and revenues (Figure 1).[1,12] Its design is based on a review of THCGME applications, site visits to selected programs, and discussions with finance experts. To capture the most complete financial picture possible, the instrument collected "in-kind" residency expenses, which are necessary to operate a residency program but are paid for or donated by another entity. The instrument also includes residents' patient service revenue, which experts consider a more accurate approach to approximate the financial burden of residencies on sponsor institutions.[1]

Fielding the Instrument

The THCGME Costing Instrument was fielded from April to November 2015 with 43 THC residencies operating during academic year 2013/2014 following two technical assistance webinars that walked through the instrument and provided a forum for questions. Follow-up calls with individual programs helped clarify data requirements and ensure consistent interpretation

across residencies of data requests. Data were analyzed using STATA statistical software Version 13.

The cost analysis was conducted by George Washington University under contract from HRSA and was approved by the Office of Management and Budget, following public review and comment.[13,14,15] The analysis was deemed exempt from review from the George Washington University Institutional Review Board.

RESULTS

THCGME Costing Instrument Submissions

Thirty-six of 43 residencies submitted THCGME Costing Instruments, yielding an 84% response rate (descriptive characteristics of the 36 residencies are provided as online supplemental material~~Table 2~~). Respondents varied by stage of operation and accredited class size. Most had 9 or fewer residents per class and the majority (27) were startup programs leveraging THCGME funding.

Data Completeness

Table 2~~3~~ provides a snapshot of data completeness across the 36 submissions. Most residencies were able to report on all or nearly all items in the THCGME Costing Instrument. ~~In some cases,~~ For residency and inpatient site expenses, lack of response indicated that the expense was not incurred and is not indicative of reporting difficulty. For ambulatory site visits and expenses, lack of response was indicative of reporting difficulty.

Residency Expenses: All 36 THC programs reported labor costs, consisting of salaries, stipends and fringe benefits for GME program staff, residents and faculty. Thirty-four residencies reported educational fees and insurance expenses, with most (31) reporting costs for licensing fees and exams, board certification preparation and/or board exams. Only 16 programs reported malpractice insurance expenses, likely reflecting FQHC receipt of medical liability protection through the Federal Tort Claims Act.[16] All but two programs reported paying for travel to conferences and courses associated with residency training. Thirty-three reported program administration expenses, although residencies differed in how they reported expenses in certain categories. For example, 22 reported occupancy as a program expense, 2 reported occupancy as an in-kind expense, and 9 reported information on residency program square footage and cost per square foot, which were used to then calculate occupancy. In contrast, the 33 programs reporting expenses for educational materials did so fairly consistently.

Ambulatory and Inpatient Visits and Payer Mix: Of the 36 submissions, ~~Thirty~~ 30 programs reported total and precepted visits for residents' ambulatory care as well as ambulatory visits by payer category. Seventeen of the 36 programs reported total inpatient visits, and 11 of 36 reported precepted inpatient visits.

Ambulatory and Inpatient Site Expenses and Revenues: Twenty-six of 36 programs reported expenses associated with administration and operation of their residents' ambulatory patient service site and revenues associated with residents' ambulatory patient service, including

revenue from visits and patient service grants. Inpatient expense and revenue reporting was limited: 16 of 36 programs reported revenues and 1 program reported administrative expenses.

DISCUSSION

The THCGME Costing Instrument provides a transparent, comprehensive approach to estimating the costs of training residents in a community-based setting. It quantifies educational and clinical expenses as well as revenues generated through residents' patient service – successfully collecting information from new and expansion programs in multiple primary care specialties with varying governance structures. This characteristic suggests the feasibility for adapting the tool for application in other residency training settings.

A key attribute of the instrument is its systematic documentation of in-kind expenses, an approach usually excluded from other GME cost estimates. This study indicates a far greater reliance by new programs than established ones on donated goods and services, with critical support received from local partners with a stake in creating sustainable community-based training programs. ~~Maintaining this enthusiasm may prove difficult, however, as~~ HRSA's per-resident THCGME funding has since dropped from $150,000 at the time of the study's data collection to its current level of $95,000, which may prove challenging for~~.~~ ~~This is especially concerning given that~~ THCs that operate in underserved communities with limited resources for shoring up budgetary shortfalls. Uncertainty in general, and lower funding levels in particular, have the potential to discourage participating clinics from continuing resident recruitment, jeopardizing the program's future.[17] A recent report by the study team documented the numeric

findings of this costing study at $157,000 per resident per year, generally confirming HRSA's original cost estimate of $150,000 per resident.[11] This suggests that THCGME funding was in line with actual training costs and may be essential to maintaining or further developing the program. Alignment between GME costs, need, and public funding has not been similarly demonstrated for Medicare GME funding.

The THCGME program also directly addresses the nation's increasing shortfall of primary care physicians, prompting recent calls to support continued funding for the program at the higher per resident rate.[10] HRSA projects a national deficit of 23,640 primary care physicians by 2025, with disproportionately higher shortages in regions with greater rurality.[18] 60% of the nation's Primary Care Health Professional Shortage Areas are located in non-metropolitan areas, and rural areas face greater health disparities.[19] ~~To date, 84% of THCGME residents have trained in a Medically Underserved Community (e.g. a Medically Underserved Area, Health Professional Shortage Area or serving a Medically Underserved Population) and 22% in a rural setting.[9]~~ Of the THCGME program's 210 graduates from the most recent academic year with available public data (2015/2016), 50 percent intend to practice in a rural setting and/or Medically Underserved Community (e.g. a Medically Underserved Area, Health Professional Shortage Area or serving a Medically Underserved Population).[9] ~~More than half (55%) intend to practice in rural and underserved areas.[8]~~ In contrast, only 32% of graduates from traditional primary care training programs intend to pursue primary care practice, and just 14% of U.S. primary physicians practice in rural areas.[20, 21] Whereas Medicare GME has been unable to effectively produce physicians that meet the nation's needs, the THCGME program works to produce the

types of physicians that the nation most needs where it most needs them, and is well-positioned to help diminish the nation's physician workforce gaps.

The study includes information on patient service revenues, which substantially alter the net financial picture of training.[11] Data from the THCGME Costing Instrument showed that the majority of THC residency programs provided services to charity care and/or uninsured patients, which will not result in revenues. Nonetheless, such service provision aligns with HRSA's mission and the THCGME program's statutory intention to prioritize care for underserved communities. THC site visits uncovered a range of opinions about whether residency programs provide a financial boost or drag to a health care organization's net revenues. The costing study allowed THCs to address that question empirically on a clinic-by-clinic basis. The inclusion of revenues necessitated the collection of clinic administration and operations information to gather a full picture of the costs of educational training, the revenues associated with resident clinical practice, and the clinical costs required to generate those revenues. All these components are necessary to address the true costs of training residents. The THC Costing Instrument study indicated that the majority of THCs were able to report the necessary information systematically and comprehensively.

The costing study does not include an additional expense category of other types of costs such as Medicare's IME payments to hospital-based residency training programs. We worked closely with the THCs on their Costing Instrument submissions to understand the nuances of their operations and any challenges associated with reporting the information we requested. We believe that an approach that includes educational expenses, apportioned revenues and associated

clinical costs, whether borne by the THC or provided through in-kind arrangements, accurately reflects the full cost of training a resident in a THC.

The THCGME Costing Instrument placed an additional reporting burden on busy training programs. For this reason, we relied whenever possible on financial, programmatic and operational information already being reported for accreditation or other grant-related purposes. Nevertheless, the study included several limitations: the instrument was fielded to 43 THCs, not the full THC population; the study had a high concentration of family medicine residencies with minimal representation from obstetrics and gynecology, pediatric and psychiatry programs; and, data reflect a single academic year, with many programs still in the formative stages.

CONCLUSION

The THC costing study was comprehensive in collecting data from community-based residencies of differing specialties, organizational structures, and sizes. Because the THC Costing Instrument and approach used are publicly available,[22] other community-based residencies and even hospital-based programs can replicate or build upon this study to develop evidence-based estimates of residency training costs. This work could help lay the foundation for a fiscally accountable, national GME system based on evidence-based costs rather than on rigid, unaccountable formulas.

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Table 1: Comparison of Medicare & Teaching Health Center GME Financing

	Medicare GME	THCGME
Statutory Authority[a]	•FMedicare has fundsed a portion of traininghe costs of training medicalfor residents who care for Medicareits covered beneficiaries •Established in 1965 as part of since Medicare •'s inception in 1965. GME payments are funded alongside Medicare as an entitlement.	•Funds training costs for residents regardless of patient coverage •Established in 2010 the ACA as an innovation in GME in ACA. •NTHCGME has no stable funding appropriation. THCGME funding was renewed as part of the 2015 MACRA legislation and is set to expire on September 30, 2017.
Estimated Annual Federal Appropriations[b]	$9.7 Billion • DGME: $2.6 Billion • IME: $6.8 Billion	$0.046 Billion
GME Payment[c]	Total Medicare GME payments vary by teaching hospital. • DGME payments are the product of: (1) allowable weighted resident FTE; (2) PRA (a geography- and inflation-adjusted dollar amount calculated based on average initial years of operation); (3) hospital's ratio of Medicare inpatient bed days to total inpatient bed days. • IME payments are an enhancement to DRG hospital payment rates.	•An interim per-resident payment initially was initially set at $150,000. •Per-resident payment but was later lowered to $95,000 as part of the 2015 MACRA legislation.
Site of Residency Training[d]	Medical care at teaching hospitals: • Acute care ($9.6B) • Specialty ($0.1B) • Community hospitals & ambulatory care (less than $0.1B) Geography/patient populations of teaching hospitals (1,031): • 80% of hospitals are urban and eligible for Medicaid DSH; payments • 13% of hospitals are urban and not eligible for Medicaid DSH; payments • 6% of hospitals are rural. Medical care at teaching hospitals as % of Estimated Annual Federal Appropriations: • 98% Acute care; • 1% Specialty; • 1% Community hospitals & ambulatory care.	Geography/patient populations for the training sites of the (59) THC grantees: • 55% are in Medically Underserved Communities;[g] • 21% are rural;[h] • 17% are National Health Service Corps approved sites.[i] Teaching Health Centers (59) Sponsorship:[j] • 76% FQHC or FQHC Look-Alike; • 12% Consortium/community-based entity; • 5% Rural Health Center; • 3% Native American Health Authority; • 2% Area Health Education Center; • 2% Community Mental Health Center.Eligible entities include community-based ambulatory patient care centers that operate a primary care residency program and that are listed as an institutional sponsor by the relevant accrediting body. Corporate entities that are consortia of an eligible entity and hospitals operating one or more primary care GME programs may be listed as the institutional sponsor, but must ensure the community-based ambulatory training site is a central partner in the consortium. Potential entities include FQHCs, FQHC Look-Alikes, community mental health centers, rural health clinics, health centers operated by the Indian Health Service, and other ambulatory

		~~centers that receive funds under Title X of the Public Health Service Act.~~
Workforce Supported[e]	•Supports all physician specialties based on "caps" set per the Balanced Budget Act of 1997. •Primary care specialties are given more weight than non-primary care specialties.	•Funds only family medicine, internal medicine, pediatrics, obstetrics and gynecology, psychiatry, geriatrics, and general and pediatric dentistry.~~Eligible GME programs include family medicine, internal medicine, internal medicine-pediatrics, obstetrics and gynecology, psychiatry, geriatrics, and general and pediatric dentistry.~~
Outcomes Monitoring[f]	•CMS regularly audits hospital cost reports for residents' FTE allocation, approved clinical rotations, and approved programs.	•HRSA uses performance measures and other means to track physician workforce outcomes from these programs.

[a] Data for Medicare statutory authority comes from Heisler et al. and Durfey.[4,10]
[b,f] Data for spending comes from the National Academy of Medicine.[1]
[c] Data for GME payments for Medicare are from National Academy of Medicine and information for THCGME is from the ACA legislation.[1,6]
[d,e] Data for Medicare teaching hospitals are from the Federal Registrar and information for THCGME is from the ACA legislation.[3,6]
[g,h] Data come from HRSA and percentages presented here are rounded to the nearest percent.[9]
[i] Data represent the number of THC practice sites identified as NHSC approved sites in HRSA Data Warehouse. NHSC Approved Sites. Online. https://datawarehouse.hrsa.gov/HGDWReports/OneClickRptFilter.aspx?rptName=NHSCAppSiteList.
[j] Sponsorship information is based on THC program's applications for funding, program survey data for THC programs operating in academic years 2014/2015 and 2015/2016 collected as part of the Evaluation and Initial Assessment of HRSA Teaching Health Centers contract, and on U.S. Department of Health and Human Services. Fiscal year 2018 HRSA justification of estimates for appropriations committees. Online. https://www.hrsa.gov/sites/default/files/hrsa/about/budget/budget-justification-2018.pdf
Abbreviations: ACA, Affordable Care Act; CMS, Centers for Medicare & Medicaid Services; DGME, direct graduate medical education; DRG, diagnosis-related group; DSH, disproportionate share hospital; FQHC, federally qualified health centers; FTE, full-time equivalent; GME, graduate medical education; HRSA, Health Resources and Services Administration; IME, indirect medical education; MACRA, Medicare Access and Children's Health Insurance Reauthorization Act; PRA, per-resident amount; THCGME, teaching health center graduate medical education.

~~**Table 2: Select Residency Characteristics, 36 THCGME Residencies that Submitted Costing Instruments**~~

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Formal Name of THC	Location	Status	Specialty	Size[a]	Accreditation[b]	Model
Appalachian Osteopathic Postgraduate Training Institute Consortium	Pikeville, KY	New	FM	2/2/2	AOA	Consortium
Cahaba Medical Care Foundation	Centreville, AL	New	FM	4/4/4	Dual	FQHC
Community Health of Central Washington	Yakima, WA	Expansion	FM	10/10/10	Dual	FQHC
Community Health Systems, Inc. DBA Access	Beckley, WV	New	FM	4/4/04	AOA	FQHC
Connecticut Institute for Communities	Danbury, CT	New	IM	5/5/05	ACGME	FQHC
Cornerstone Care, Inc.	Greensboro, PA	New	FM	4/4/04	AOA	FQHC
Detroit Wayne County Health Authority	Detroit, MI	New	FM	6/6/6/	AOA	Consortium
Detroit Wayne County Health Authority	Detroit, MI	New	IM	4/4/4	AOA	Consortium
Detroit Wayne County Health Authority	Detroit, MI	New	OB/GYN	2/2/2/2	AOA	Consortium
Detroit Wayne County Health Authority	Detroit, MI	New	PEDS	7/7/7	AOA	Consortium
Detroit Wayne County Health Authority	Detroit, MI	New	PSYCH	5/5/5/5	AOA	Consortium
Family Medicine Residency of Idaho	Boise, ID	Expansion	FM	16/16/16	ACGME	FQHC
Fresno Healthy Communities Access Partners	Fresno, CA	New	FM	4/4/4	ACGME	Consortium
Greater Lawrence Family Health Center	Lawrence, MA	Expansion	FM	10/10/10/10	ACGME	FQHC
Hamilton Community Health Center	Genesee, MI	New	FM	8/8/8	AOA	FQHC
Hidalgo Medical Services	Lordsburg, NM	New	FM	2/2/2	ACGME	FQHC
Institute for Family Health	New York, NY	New	FM	12/12/12	ACGME	FQHC
Institute for Family Health	New York, NY	Expansion	FM	10/10/10	Dual	FQHC
Lone Star Community Health Center, Inc.	Conroe, TX	Expansion	FM	10/10/8	Dual	FQHC
Long Island FQHC	Hempstead, NY	New	FM	6/6/6	AOA	FQHC
Montana Family Medicine Residency	Billings, MO	Expansion	FM	8/8/8	Dual	FQHC
Morton Comprehensive Services	Tulsa, OK	New		2/2/2		
MAHEC, Inc./Blue Ridge	Hendersonville, NC	Expansion	FM	4/4/4	ACGME	Consortium
Northwestern University / Erie	Evanston, IL	New	FM	8/8/8	ACGME	Consortium
OMECO Family Medicine	Tulsa, OK	New	FM	5/5/5	AOA	Consortium
OMECO Obstetrics and Gynecology	Tulsa, OK	New	OB/GYN	3/3/3/3	AOA	Consortium

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OMECO Pediatrics	Tulsa, OK	New	PEDS	5/5/5	AOA	Consortium
Ozark Center	Joplin, MO	New	PSYCH	3/3/3/3	AOA	Consortium
Penobscot Community Health Center	Penobscot, ME	New	DENTAL	5	CODA	FQHC
Primary Health Care Inc.	Des Moines, IA	New	IM	10/10/10	AOA	FQHC
Puyallup Tribal Health Authority	Tacoma, WA	New	FM	4/4/4	AOA	Tribal Health Authority
Shasta Community Health Center	Redding, CA	New	FM	2/2/2	ACGME	FQHC
Tahlequah Medical Group		New	IM			Tribal Health Authority
University of Arkansas System/UAMS-West	Little Rock, AR	Expansion	FM	10/10/8	ACGME	AHEC
Valley Consortium for Medical Education	Modesto, CA	Expansion	FM	12/12/12	ACGME	Consortium
YVFW Northwest Dental Residency	Toppenish, WA	Expansion	DENTAL	6	CODA	FQHC
YVFW Sollus Northwest Family Medicine Residency	Toppenish, WA	New	FM	2/2/2	AOA	FQHC

[a]Size based on accredited number of resident slots per year.
[b]As of Academic Year 2013/2014. AOA and ACGME accreditation is now merging to a single system and the single accreditation is expected to be complete for all programs by 2020. Dual means accredited by AOA and ACGME. Abbreviations: AOA, American Osteopathic Association; ACGME, Accreditation Council for Graduate Medical Education; CODA, Commission on Dental Accreditation; DBA, doing business as; DENTAL, dentistry; FM, family medicine; FQHC, federally qualified health center; IM, internal medicine; MAHEC, Mountain Area Health Education Center; OB/GYN, obstetrics and gynecology; OMECO, Osteopathic Medical Education Consortium of Oklahoma; PEDS, pediatrics; PSYCH, psychiatry; THC, teaching health center; THCGME, teaching health center graduate medical education; UAMS, University of Arkansas for Medical Sciences; YVFW, Yakima Valley Farm Workers.

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Table 2~~3~~: Expense and Revenue Data Collected by the THCGME Costing Instrument

Costing Instrument Category	# of Programs Reporting
Residency Expenses	**36**
Labor Costs	**36**
Salaries, stipends, and benefits for GME program staff, residents and faculty	36
Contracts for precepting physicians	27
Educational Fees & Insurance	**34**
Malpractice insurance	16
Conference travel and fees	34
Licensing fees	31
Housing	4
Educational Materials	**33**
Simulation equipment	6
IT Software; laptops; email service for residents	33
Textbooks; library resources; journal subscriptions	31
Program Administration	**33**
Overhead for clinical and non-clinical space	33
GME accreditation fees and credentialing	25
Faculty development	31
Resident recruitment and orientation	26
Graduation	11
Visits	**30**
Ambulatory Care	**30**
Total visits	30
Faculty precepted resident visits by post-graduate year	30
Inpatient Care	**17**
Total visits	17
Faculty precepted resident visits by post-graduate year	11
Payer Mix	**30**
Share of patient visits covered by public & private payers	30
Share of patient visits that were charity care	14
Share of self-paid visits	24
Residents' Patient Service Expenses & Revenues	**26**
Labor Costs	**20**
Administration personnel salaries and benefits	20
Purchased administrative services	15
Administration	**23**
IT Infrastructure	14
Occupancy for ambulatory care site	23
License & Fees for Ambulatory Patient Service Site(s)	**19**
Licensing fees	13
Malpractice insurance	13
Electronic health records licensing and maintenance	19
Revenues	**30**
Public and private payers	30
Charity Care	5
Self-Pay	25
Federally Qualified Health Center grants and other patient service grants	13

Abbreviations: GME, graduate medical education; IT, information technology; THCGME, teaching health center graduate medical education.

Supplemental Material 1: Select Residency Characteristics, 36 THCGME Residencies that Submitted Costing Instruments

Formal Name of THC	Location	Status	Specialty	Size[a]	Accreditation[b]	Model
Appalachian Osteopathic Postgraduate Training Institute Consortium	Pikeville, KY	New	FM	2/2/2	AOA	Consortium
Cahaba Medical Care Foundation	Centreville, AL	New	FM	4/4/4	Dual	FQHC
Community Health of Central Washington	Yakima, WA	Expansion	FM	10/10/10	Dual	FQHC
Community Health Systems, Inc. DBA Access	Beckley, WV	New	FM	4/4/04	AOA	FQHC
Connecticut Institute for Communities	Danbury, CT	New	IM	5/5/05	ACGME	FQHC
Cornerstone Care, Inc.	Greensboro, PA	New	FM	4/4/04	AOA	FQHC
Detroit Wayne County Health Authority	Detroit, MI	New	FM	6/6/6/	AOA	Consortium
Detroit Wayne County Health Authority	Detroit, MI	New	IM	4/4/4	AOA	Consortium
Detroit Wayne County Health Authority	Detroit, MI	New	OB/GYN	2/2/2/2	AOA	Consortium
Detroit Wayne County Health Authority	Detroit, MI	New	PEDS	7/7/7	AOA	Consortium
Detroit Wayne County Health Authority	Detroit, MI	New	PSYCH	5/5/5/5	AOA	Consortium
Family Medicine Residency of Idaho	Boise, ID	Expansion	FM	16/16/16	ACGME	FQHC
Fresno Healthy Communities Access Partners	Fresno, CA	New	FM	4/4/4	ACGME	Consortium
Greater Lawrence Family Health Center	Lawrence, MA	Expansion	FM	10/10/10/10	ACGME	FQHC
Hamilton Community Health Center	Genesee, MI	New	FM	8/8/8	AOA	FQHC
Hidalgo Medical Services	Lordsburg, NM	New	FM	2/2/2	ACGME	FQHC
Institute for Family Health	New York, NY	New	FM	12/12/12	ACGME	FQHC
Institute for Family Health	New York, NY	Expansion	FM	10/10/10	Dual	FQHC
Lone Star Community Health Center, Inc.	Conroe, TX	Expansion	FM	10/10/8	Dual	FQHC
Long Island FQHC	Hempstead, NY	New	FM	6/6/6	AOA	FQHC
MAHEC, Inc./Blue Ridge	Hendersonville, NC	Expansion	FM	4/4/4	ACGME	Consortium
Montana Family Medicine Residency	Billings, MO	Expansion	FM	8/8/8	Dual	FQHC
Morton Comprehensive Services	Tulsa, OK	New	FM	2/2/2	ACGME	FQHC
Northwestern University / Erie	Evanston, IL	New	FM	8/8/8	ACGME	Consortium
OMECO Family Medicine	Tulsa, OK	New	FM	5/5/5	AOA	Consortium
OMECO Obstetrics and Gynecology	Tulsa, OK	New	OB/GYN	3/3/3/3	AOA	Consortium
OMECO Pediatrics	Tulsa, OK	New	PEDS	5/5/5	AOA	Consortium
Ozark Center	Joplin, MO	New	PSYCH	3/3/3/3	AOA	Consortium
Penobscot Community Health Center	Penobscot, ME	New	DENTAL	5	CODA	FQHC
Primary Health Care Inc.	Des Moines, IA	New	IM	10/10/10	AOA	FQHC

Formal Name of THC	Location	Status	Specialty	Size[a]	Accreditation[b]	Model
Puyallup Tribal Health Authority	Tacoma, WA	New	FM	4/4/4	AOA	Native American Health Authority
Shasta Community Health Center	Redding, CA	New	FM	2/2/2	ACGME	FQHC
Tahlequah Medical Group	Tahlequah, OK	New	IM	4/4/4	AOA	Native American Health Authority
University of Arkansas System/UAMS-West	Little Rock, AR	Expansion	FM	10/10/8	ACGME	AHEC
Valley Consortium for Medical Education	Modesto, CA	Expansion	FM	12/12/12	ACGME	Consortium
YVFW Northwest Dental Residency	Toppenish, WA	Expansion	DENTAL	6	CODA	FQHC
YVFW Sollus Northwest Family Medicine Residency	Toppenish, WA	New	FM	2/2/2	AOA	FQHC

[a]Size based on accredited number of resident slots per year.

[b]As of Academic Year 2013/2014. AOA and ACGME accreditation is now merging to a single system and the single accreditation is expected to be complete for all programs by 2020. Dual means accredited by AOA and ACGME. Abbreviations: AOA, American Osteopathic Association; ACGME, Accreditation Council for Graduate Medical Education; CODA, Commission on Dental Accreditation; DBA, doing business as; DENTAL, dentistry; FM, family medicine; FQHC, federally qualified health center; IM, internal medicine; MAHEC, Mountain Area Health Education Center; OB/GYN, obstetrics and gynecology; OMECO, Osteopathic Medical Education Consortium of Oklahoma; PEDS, pediatrics; PSYCH, psychiatry; THC, teaching health center; THCGME, teaching health center graduate medical education; UAMS, University of Arkansas for Medical Sciences; YVFW, Yakima Valley Farm Workers.

Full Title: Comprehensive Revenue and Expense Data Collection Methodology for Teaching Health Centers: A Model for Accountable Graduate Medical Education Financing
Short Title: THCGME: A Model for Transparent, Accountable GME Financing

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Abbreviations

ACA	Affordable Care Act
AHEC	Area Health Education Center
DGME	Direct Graduate Medical Education
GME	Graduate Medical Education
FQHC	Federally Qualified Health Center
HRSA	Health Resources and Services Administration
IME	Indirect Medical Education
THC	Teaching Health Center
THCGME	Teaching Health Center Graduate Medical Education

INTRODUCTION

A landmark 2014 National Academy of Medicine report on U.S. graduate medical education (GME) remarked that GME financing lacks sufficient transparency to estimate residency training costs or accountability to produce a physician workforce that matches the nation's healthcare needs.[1] More than $10 billion was spent on GME in 2016, with Medicare GME payments representing approximately 90% of that total (Table 1).[2,3] Yet, Medicare GME payments are not based on standardized, comprehensive cost data from teaching hospitals.[4] Medicare payments fall into two major categories – direct GME (DGME) and indirect GME (IME). DGME payments, which compensate teaching hospitals for labor costs and educational activities, are tied to the average cost of a hospital's initial years of operating a training program. However, for most hospitals, payments are based on 1984 reported costs. Even with adjustments for cost of living, payments bear little resemblance to hospitals' residency costs today.[1] IME payments—which teaching hospitals receive as an enhancement to their Medicare per-case discharge rates—are essentially baked into the business of providing clinical care irrespective of the actual educational costs associated with running a residency.[5]

Amidst ongoing challenges of transparency and accountability in Medicare GME financing, an opportunity was created in 2010 through the Affordable Care Act (ACA) to systematically collect data to estimate the cost of residency training in community-based settings with the establishment of the Teaching Health Center Graduate Medical Education (THCGME) program.[6] Details of the THCGME program are described in other publications.[7,8,9] Unlike Medicare GME,

THCGME payments were designed to support resident training in underserved and rural communities irrespective of the payer attached to patients seeking care at the training site.[10] Under ACA provisions, the Secretary of Health and Human Services initially set the annual per-resident THCGME payment at $150,000, an interim amount based on expert opinion that would be adjusted following an actual analysis of THCGME residency training costs.[6]

This cost analysis, part of a five-year evaluation of the THCGME program, represents the first government-sponsored systematic data collection effort to standardize expenses and revenues associated with training a primary care resident.[1,4] This paper describes the methodology to quantify these costs and thereby provides a mechanism for achieving greater transparency in federal GME investments.

METHODS

Context of the THCGME Cost Analysis

THCGME supports accredited training programs through direct funding of community-based organizations serving as residency sponsors. Hospital and university-sponsored residencies are ineligible for THCGME funding.[8] Current Teaching Health Centers (THCs) include Federally Qualified Health Centers (FQHCs), consortia of community-based sites, behavioral health clinics, dental clinics, Area Health Education Center (AHEC) organizations, and Tribal Health Authorities. As of May 2017, THCGME funded 59 residency programs; of these, 42 began operations with THCGME funding and 17 pre-existing programs expanded their classes to include additional THCGME slots.[11] THCGME funds supported three dentistry, 37 family

medicine, one geriatrics, eight internal medicine, three pediatrics, three obstetrics/gynecology, and four psychiatry primary care residencies in academic year 2016/2017.[8]

Designing the THCGME Costing Instrument

We designed the THCGME Costing Instrument to comprehensively capture the full range of training expenses regardless of how programs categorize them within their own organizational context. The tool collects data on residency expenses, residents' ambulatory and inpatient care, payer mix, and residents' patient service expenses and revenues (Figure 1).[1,12] Its design is based on a review of THCGME applications, site visits to selected programs, and discussions with finance experts. To capture the most complete financial picture possible, the instrument collected "in-kind" residency expenses, which are necessary to operate a residency program but are paid for or donated by another entity. The instrument also includes residents' patient service revenue, which experts consider a more accurate approach to approximate the financial burden of residencies on sponsor institutions.[1]

Fielding the Instrument

The THCGME Costing Instrument was fielded from April to November 2015 with 43 THC residencies operating during academic year 2013/2014 following two technical assistance webinars that walked through the instrument and provided a forum for questions. Follow-up calls with individual programs helped clarify data requirements and ensure consistent interpretation across residencies of data requests. Data were analyzed using STATA statistical software Version 13.

The cost analysis was conducted by George Washington University under contract from HRSA and was approved by the Office of Management and Budget, following public review and comment.[13,14,15] The analysis was deemed exempt from review from the George Washington University Institutional Review Board.

RESULTS

THCGME Costing Instrument Submissions

Thirty-six of 43 residencies submitted THCGME Costing Instruments, yielding an 84% response rate (descriptive characteristics of the 36 residencies are provided as online supplemental material). Respondents varied by stage of operation and accredited class size. Most had 9 or fewer residents per class and the majority (27) were startup programs leveraging THCGME funding.

Data Completeness

Table 2 provides a snapshot of data completeness across the 36 submissions. Most residencies were able to report on all or nearly all items in the THCGME Costing Instrument. For residency and inpatient site expenses, lack of response indicated that the expense was not incurred and is not indicative of reporting difficulty. For ambulatory site visits and expenses, lack of response was indicative of reporting difficulty.

Residency Expenses: All 36 THC programs reported labor costs, consisting of salaries, stipends and fringe benefits for GME program staff, residents and faculty. Thirty-four residencies

reported educational fees and insurance expenses, with most (31) reporting costs for licensing fees and exams, board certification preparation and/or board exams. Only 16 programs reported malpractice insurance expenses, likely reflecting FQHC receipt of medical liability protection through the Federal Tort Claims Act.[16] All but two programs reported paying for travel to conferences and courses associated with residency training. Thirty-three reported program administration expenses, although residencies differed in how they reported expenses in certain categories. For example, 22 reported occupancy as a program expense, 2 reported occupancy as an in-kind expense, and 9 reported information on residency program square footage and cost per square foot, which were used to then calculate occupancy. In contrast, the 33 programs reporting expenses for educational materials did so fairly consistently.

Ambulatory and Inpatient Visits and Payer Mix: Of the 36 submissions, 30 programs reported total and precepted visits for residents' ambulatory care as well as ambulatory visits by payer category. Seventeen of the 36 programs reported total inpatient visits, and 11 of 36 reported precepted inpatient visits.

Ambulatory and Inpatient Site Expenses and Revenues: Twenty-six of 36 programs reported expenses associated with administration and operation of their residents' ambulatory patient service site and revenues associated with residents' ambulatory patient service, including revenue from visits and patient service grants. Inpatient expense and revenue reporting was limited: 16 of 36 programs reported revenues and 1 program reported administrative expenses.

DISCUSSION

The THCGME Costing Instrument provides a transparent, comprehensive approach to estimating the costs of training residents in a community-based setting. It quantifies educational and clinical expenses as well as revenues generated through residents' patient service – successfully collecting information from new and expansion programs in multiple primary care specialties with varying governance structures. This characteristic suggests the feasibility for adapting the tool for application in other residency training settings.

A key attribute of the instrument is its systematic documentation of in-kind expenses, an approach usually excluded from other GME cost estimates. This study indicates a far greater reliance by new programs than established ones on donated goods and services, with critical support received from local partners with a stake in creating sustainable community-based training programs. HRSA's per-resident THCGME funding has since dropped from $150,000 at the time of the study's data collection to its current level of $95,000, which may prove challenging for THCs that operate in underserved communities with limited resources for shoring up budgetary shortfalls. Uncertainty in general, and lower funding levels in particular, have the potential to discourage participating clinics from continuing resident recruitment, jeopardizing the program's future.[17] A recent report by the study team documented the numeric findings of this costing study at $157,000 per resident per year, generally confirming HRSA's original cost estimate of $150,000 per resident.[11] This suggests that THCGME funding was in line with actual training costs and may be essential to maintaining or further developing the program. Alignment between GME costs, need, and public funding has not been similarly demonstrated for Medicare GME funding.

The THCGME program also directly addresses the nation's increasing shortfall of primary care physicians, prompting recent calls to support continued funding for the program at the higher per resident rate.[10] HRSA projects a national deficit of 23,640 primary care physicians by 2025, with disproportionately higher shortages in regions with greater rurality.[18] 60% of the nation's Primary Care Health Professional Shortage Areas are located in non-metropolitan areas, and rural areas face greater health disparities.[19] Of the THCGME program's 210 graduates from the most recent academic year with available public data (2015/2016), 50 percent intend to practice in a rural setting and/or Medically Underserved Community (e.g. a Medically Underserved Area, Health Professional Shortage Area or serving a Medically Underserved Population).[9] In contrast, only 32% of graduates from traditional primary care training programs intend to pursue primary care practice, and just 14% of U.S. primary physicians practice in rural areas.[20, 21] Whereas Medicare GME has been unable to effectively produce physicians that meet the nation's needs, the THCGME program works to produce the types of physicians that the nation most needs where it most needs them, and is well-positioned to help diminish the nation's physician workforce gaps.

The study includes information on patient service revenues, which substantially alter the net financial picture of training.[11] Data from the THCGME Costing Instrument showed that the majority of THC residency programs provided services to charity care and/or uninsured patients, which will not result in revenues. Nonetheless, such service provision aligns with HRSA's mission and the THCGME program's statutory intention to prioritize care for underserved communities. THC site visits uncovered a range of opinions about whether residency programs

provide a financial boost or drag to a health care organization's net revenues. The costing study allowed THCs to address that question empirically on a clinic-by-clinic basis. The inclusion of revenues necessitated the collection of clinic administration and operations information to gather a full picture of the costs of educational training, the revenues associated with resident clinical practice, and the clinical costs required to generate those revenues. All these components are necessary to address the true costs of training residents. The THC Costing Instrument study indicated that the majority of THCs were able to report the necessary information systematically and comprehensively.

The costing study does not include an additional expense category of other types of costs such as Medicare's IME payments to hospital-based residency training programs. We worked closely with the THCs on their Costing Instrument submissions to understand the nuances of their operations and any challenges associated with reporting the information we requested. We believe that an approach that includes educational expenses, apportioned revenues and associated clinical costs, whether borne by the THC or provided through in-kind arrangements, accurately reflects the full cost of training a resident in a THC.

The THCGME Costing Instrument placed an additional reporting burden on busy training programs. For this reason, we relied whenever possible on financial, programmatic and operational information already being reported for accreditation or other grant-related purposes. Nevertheless, the study included several limitations: the instrument was fielded to 43 THCs, not the full THC population; the study had a high concentration of family medicine residencies with

minimal representation from obstetrics and gynecology, pediatric and psychiatry programs; and, data reflect a single academic year, with many programs still in the formative stages.

CONCLUSION

The THC costing study was comprehensive in collecting data from community-based residencies of differing specialties, organizational structures, and sizes. Because the THC Costing Instrument and approach used are publicly available, [22] other community-based residencies and even hospital-based programs can replicate or build upon this study to develop evidence-based estimates of residency training costs. This work could help lay the foundation for a fiscally accountable, national GME system based on evidence-based costs rather than on rigid, unaccountable formulas.

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Figure

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Figure 1: Data Captured in the THCGME Costing Instrument

RESIDENCY EXPENSES	**Labor Costs** Salaries, stipends and fringe benefits for graduate medical education program staff, residents, and faculty Contracts for precepting physicians Educational Fees & Insurance Malpractice Insurance Conference Travel and Fees Housing License Fees Outside Tuition (e.g., board review, courses, other degree programs) **Educational Materials** Simulation Equipment Software Textbooks **Program Administration** Overhead for Clinical and Non-Clinical Space GME Accreditation Fees Credentialing Faculty Development Resident Recruitment Costs Orientation Programs Retreats and Graduation
AMBULATORY AND INPATIENT VISITS & PAYER MIX	**Ambulatory Visits** Total Visits Faculty Precepted Resident Visits by Post-Graduate Year **Inpatient Visits** Total Visits Faculty Precepted Resident Visits by Post-Graduate Year **Payer Mix** Share of Patient Visits Covered by Public and Private Payers Share of Patient Visits that were Charity Care Share of Self-Paid Visits
RESIDENTS' AMBULATORY AND INPATIENT SITES EXPENSES & REVENUES	**Labor Costs** Administration Personnel Salaries and Fringe Benefits Purchased Administrative Services Administration IT Infrastructure Overhead for Ambulatory Patient Service Site(s) Occupancy for Ambulatory Patient Service Site(s) **Licensing & Fees for Ambulatory Patient Service Site(s)** Licensing Fees Malpractice Insurance Electronic Health Records Licensing & Maintenance **Revenues** Public and Private Payers Charity Care Self-Pay Federally Qualified Health Center Grants and Other Ambulatory Patient Service Grants

[a] Except for resident recruitment costs, orientation programs, retreats and graduation, which are disallowed from Medicare DGME payments, residency expenses in table align with National Academy of Medicine[1].

[b] Programs reported payer mix using the categories in the UDS.[11]

Abbreviations: GME, graduate medical education; HRSA, Health Resources and Services Administration; UDS, Uniform Data System.

Table 1: Comparison of Medicare & Teaching Health Center GME Financing

	Medicare GME	THCGME
Statutory Authority[a]	•Funds a portion of training costs for residents who care for Medicare covered beneficiaries •Established in 1965 as part of Medicare •GME payments are an entitlement	•Funds training costs for residents regardless of patient coverage •Established in 2010 as an innovation in GME in ACA •No stable funding appropriation
Estimated Annual Federal Appropriations[b]	$9.7 Billion • DGME: $2.6 Billion • IME: $6.8 Billion	$0.046 Billion
GME Payment[c]	Total Medicare GME payments vary by teaching hospital. • DGME payments are the product of: (1) allowable weighted resident FTE; (2) PRA (a geography- and inflation-adjusted dollar amount calculated based on average initial years of operation); (3) ratio of Medicare to total inpatient bed days. • IME payments are an enhancement to DRG hospital payment rates.	•An interim per-resident payment initially set at $150,000. •Per-resident payment was lowered to $95,000 as part of the 2015 MACRA legislation.
Site of Residency Training[d]	Geography/patient populations of teaching hospitals (1,031): • 80% are urban and eligible for Medicaid DSH; • 13% are urban and not eligible for Medicaid DSH; • 6% are rural. Medical care at teaching hospitals as % of Estimated Annual Federal Appropriations: • 98% Acute care; • 1% Specialty; • 1% Community hospitals & ambulatory care.	Geography/patient populations for the training sites of the (59) THC grantees: • 55% are in Medically Underserved Communities;[g] • 21% are rural;[h] • 17% are National Health Service Corps approved sites.[i] Teaching Health Centers (59) Sponsorship:[j] • 76% FQHC or FQHC Look-Alike; • 12% Consortium/community-based entity; • 5% Rural Health Center; • 3% Native American Health Authority; • 2% Area Health Education Center; • 2% Community Mental Health Center.
Workforce Supported[e]	•Supports all physician specialties based on "caps" set per the Balanced Budget Act of 1997. •Primary care specialties are given more weight than non-primary care specialties.	•Funds only family medicine, internal medicine, pediatrics, obstetrics and gynecology, psychiatry, geriatrics, and general and pediatric dentistry.
Outcomes Monitoring[f]	•CMS regularly audits hospital cost reports for residents' FTE allocation, approved clinical rotations, and approved programs.	•HRSA uses performance measures and other means to track physician workforce outcomes from these programs.

[a] Data for Medicare statutory authority comes from Heisler et al. and Durfey.[4,10]
[b,f] Data for spending comes from the National Academy of Medicine.[1]
[c] Data for GME payments for Medicare are from National Academy of Medicine and information for THCGME is from the ACA legislation.[1,6]
[d,e] Data for Medicare teaching hospitals are from the Federal Registrar and information for THCGME is from the ACA legislation.[3,6]
[g,h] Data come from HRSA and percentages presented here are rounded to the nearest percent.[9]
[i] Data represent the number of THC practice sites identified as NHSC approved sites in HRSA Data Warehouse. NHSC Approved Sites. Online. https://datawarehouse.hrsa.gov/HGDWReports/OneClickRptFilter.aspx?rptName=NHSCAppSiteList.
[j] Sponsorship information is based on THC program's applications for funding, program survey data for THC programs operating in academic years 2014/2015 and 2015/2016 collected as part of the Evaluation and Initial

Assessment of HRSA Teaching Health Centers contract, and on U.S. Department of Health and Human Services. Fiscal year 2018 HRSA justification of estimates for appropriations committees. Online. https://www.hrsa.gov/sites/default/files/hrsa/about/budget/budget-justification-2018.pdf

Abbreviations: ACA, Affordable Care Act; CMS, Centers for Medicare & Medicaid Services; DGME, direct graduate medical education; DRG, diagnosis-related group; DSH, disproportionate share hospital; FQHC, federally qualified health centers; FTE, full-time equivalent; GME, graduate medical education; HRSA, Health Resources and Services Administration; IME, indirect medical education; MACRA, Medicare Access and Children's Health Insurance Reauthorization Act; PRA, per-resident amount; THCGME, teaching health center graduate medical education.

Table 2: Expense and Revenue Data Collected by the THCGME Costing Instrument

Costing Instrument Category	# of Programs Reporting
Residency Expenses	**36**
Labor Costs	**36**
Salaries, stipends, and benefits for GME program staff, residents and faculty	36
Contracts for precepting physicians	27
Educational Fees & Insurance	**34**
Malpractice insurance	16
Conference travel and fees	34
Licensing fees	31
Housing	4
Educational Materials	**33**
Simulation equipment	6
IT Software; laptops; email service for residents	33
Textbooks; library resources; journal subscriptions	31
Program Administration	**33**
Overhead for clinical and non-clinical space	33
GME accreditation fees and credentialing	25
Faculty development	31
Resident recruitment and orientation	26
Graduation	11
Visits	**30**
Ambulatory Care	**30**
Total visits	30
Faculty precepted resident visits by post-graduate year	30
Inpatient Care	**17**
Total visits	17
Faculty precepted resident visits by post-graduate year	11
Payer Mix	**30**
Share of patient visits covered by public & private payers	30
Share of patient visits that were charity care	14
Share of self-paid visits	24
Residents' Patient Service Expenses & Revenues	**26**
Labor Costs	**20**
Administration personnel salaries and benefits	20
Purchased administrative services	15
Administration	**23**
IT Infrastructure	14
Occupancy for ambulatory care site	23
License & Fees for Ambulatory Patient Service Site(s)	**19**
Licensing fees	13
Malpractice insurance	13
Electronic health records licensing and maintenance	19
Revenues	**30**
Public and private payers	30
Charity Care	5
Self-Pay	25
Federally Qualified Health Center grants and other patient service grants	13

Abbreviations: GME, graduate medical education; IT, information technology; THCGME, teaching health center graduate medical education.

Supplemental Material 1: Select Residency Characteristics, 36 THCGME Residencies that Submitted Costing Instruments

Formal Name of THC	Location	Status	Specialty	Size[a]	Accreditation[b]	Model
Appalachian Osteopathic Postgraduate Training Institute Consortium	Pikeville, KY	New	FM	2/2/2	AOA	Consortium
Cahaba Medical Care Foundation	Centreville, AL	New	FM	4/4/4	Dual	FQHC
Community Health of Central Washington	Yakima, WA	Expansion	FM	10/10/10	Dual	FQHC
Community Health Systems, Inc. DBA Access	Beckley, WV	New	FM	4/4/04	AOA	FQHC
Connecticut Institute for Communities	Danbury, CT	New	IM	5/5/05	ACGME	FQHC
Cornerstone Care, Inc.	Greensboro, PA	New	FM	4/4/04	AOA	FQHC
Detroit Wayne County Health Authority	Detroit, MI	New	FM	6/6/6/	AOA	Consortium
Detroit Wayne County Health Authority	Detroit, MI	New	IM	4/4/4	AOA	Consortium
Detroit Wayne County Health Authority	Detroit, MI	New	OB/GYN	2/2/2/2	AOA	Consortium
Detroit Wayne County Health Authority	Detroit, MI	New	PEDS	7/7/7	AOA	Consortium
Detroit Wayne County Health Authority	Detroit, MI	New	PSYCH	5/5/5/5	AOA	Consortium
Family Medicine Residency of Idaho	Boise, ID	Expansion	FM	16/16/16	ACGME	FQHC
Fresno Healthy Communities Access Partners	Fresno, CA	New	FM	4/4/4	ACGME	Consortium
Greater Lawrence Family Health Center	Lawrence, MA	Expansion	FM	10/10/10/10	ACGME	FQHC
Hamilton Community Health Center	Genesee, MI	New	FM	8/8/8	AOA	FQHC
Hidalgo Medical Services	Lordsburg, NM	New	FM	2/2/2	ACGME	FQHC
Institute for Family Health	New York, NY	New	FM	12/12/12	ACGME	FQHC
Institute for Family Health	New York, NY	Expansion	FM	10/10/10	Dual	FQHC
Lone Star Community Health Center, Inc.	Conroe, TX	Expansion	FM	10/10/8	Dual	FQHC
Long Island FQHC	Hempstead, NY	New	FM	6/6/6	AOA	FQHC
MAHEC, Inc./Blue Ridge	Hendersonville, NC	Expansion	FM	4/4/4	ACGME	Consortium
Montana Family Medicine Residency	Billings, MO	Expansion	FM	8/8/8	Dual	FQHC
Morton Comprehensive Services	Tulsa, OK	New	FM	2/2/2	ACGME	FQHC
Northwestern University / Erie	Evanston, IL	New	FM	8/8/8	ACGME	Consortium
OMECO Family Medicine	Tulsa, OK	New	FM	5/5/5	AOA	Consortium
OMECO Obstetrics and Gynecology	Tulsa, OK	New	OB/GYN	3/3/3/3	AOA	Consortium
OMECO Pediatrics	Tulsa, OK	New	PEDS	5/5/5	AOA	Consortium
Ozark Center	Joplin, MO	New	PSYCH	3/3/3/3	AOA	Consortium
Penobscot Community Health Center	Penobscot, ME	New	DENTAL	5	CODA	FQHC
Primary Health Care Inc.	Des Moines, IA	New	IM	10/10/10	AOA	FQHC

Formal Name of THC	Location	Status	Specialty	Size[a]	Accreditation[b]	Model
Puyallup Tribal Health Authority	Tacoma, WA	New	FM	4/4/4	AOA	Native American Health Authority
Shasta Community Health Center	Redding, CA	New	FM	2/2/2	ACGME	FQHC
Tahlequah Medical Group	Tahlequah, OK	New	IM	4/4/4	AOA	Native American Health Authority
University of Arkansas System/UAMS-West	Little Rock, AR	Expansion	FM	10/10/8	ACGME	AHEC
Valley Consortium for Medical Education	Modesto, CA	Expansion	FM	12/12/12	ACGME	Consortium
YVFW Northwest Dental Residency	Toppenish, WA	Expansion	DENTAL	6	CODA	FQHC
YVFW Sollus Northwest Family Medicine Residency	Toppenish, WA	New	FM	2/2/2	AOA	FQHC

[a]Size based on accredited number of resident slots per year.

[b]As of Academic Year 2013/2014. AOA and ACGME accreditation is now merging to a single system and the single accreditation is expected to be complete for all programs by 2020. Dual means accredited by AOA and ACGME. Abbreviations: AOA, American Osteopathic Association; ACGME, Accreditation Council for Graduate Medical Education; CODA, Commission on Dental Accreditation; DBA, doing business as; DENTAL, dentistry; FM, family medicine; FQHC, federally qualified health center; IM, internal medicine; MAHEC, Mountain Area Health Education Center; OB/GYN, obstetrics and gynecology; OMECO, Osteopathic Medical Education Consortium of Oklahoma; PEDS, pediatrics; PSYCH, psychiatry; THC, teaching health center; THCGME, teaching health center graduate medical education; UAMS, University of Arkansas for Medical Sciences; YVFW, Yakima Valley Farm Workers.